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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/748,919	12/27/2000	Chikayoshi Kamata	0941.65074	5081

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EXAMINER
NGUYEN, DZUNG C

ART UNIT	PAPER NUMBER
2652	

DATE MAILED: 06/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/748,919	KAMATA ET AL.	
	Examiner	Art Unit	
	Dzung C Nguyen	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *29 April 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) *8-12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1-12 are pending in this patent application.

2. Applicant's election (filed on 4/29/02) of group I, claims 1-7, has received and entered.

3. Claims 1-7 are presented for examination.

Response/Restriction

4. Applicant's election without traverse of invention group I claims 1-7 in Paper No. 5 is acknowledged.

Claim Rejections - 35 U.S.C. § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al, US patent (5,491,600).

Regarding claim 1, Chen et al teach a magneto-resistive magnetic sensor [fig 2], comprising: a magneto-resistive structure [36, MR, fig 2] changing a resistance thereof in response to an external magnetic field [(see fig 9); a cap layer [CAP, fig 9], provided on a top surface of said magneto-resistive structure [MR] (see fig 9); a pair of magnetic regions [35, fig 2] over both side of [36] disposed at both lateral sides of said magneto-resistive structure [36], said magnetic regions [35] having a magnetization pointing in a common direction [32, fig 2]; a pair of electrodes [38 and 40] provided on said pair of magnetic regions [35] so as to oppose with each other across said magneto-resistive structure [36], said electrodes [38 and 40] having respective overhang parts [overlap both portions of MR 36, fig 2] extending over said magneto-resistive structure so as to oppose with each other with a gap [gap between 38 and 40, fig 2] therebetween. (See fig 2); wherein each of said overhang parts [portions covers the CAP, fig 9] covers said cap layer [CAP] on said magneto-resistive structure [36] in such a state that an oxidation-resistant conductive layer [170, fig 9] is interposed between said cap layer [CAP] and said overhang part (see figs 2 and 9 and col. 7 lines 47-61).

Claim Rejections - 35 U.S.C. § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al, US patent (5,491,600) as applied to the rejection of claim 1 in paragraph 6 above.

Regarding claim 2, Chen do not teach that the oxidation-resistant conductive layer is formed of a metal selected from the group consisting of Au, Pt and Cu. However, Chen et al teach that the oxidation-resistant conductive layer is formed of a aluminum (see col. 7 lines 51).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the oxidation-resistant conductive layer is formed of a metal selected from the group consisting of Au, Pt and Cu because the Au, Pt and Cu have better conductivity than aluminum, since it has been held to

be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In Re Leshin, 125 USPQ 416.

Regarding claims 3-4, Chen do not teach that wherein said oxidation-resistant conductive layer has a thickness larger than about l nm (claim 3); wherein said oxidation-resistant conductive layer has a thickness of larger than about 3nm (claim 4); wherein said oxidation-resistant conductive layer has a thickness of smaller than about 10nm (claim 5).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the oxidation-resistant conductive layer has a thickness larger than about l nm (claim 3); wherein said oxidation-resistant conductive layer has a thickness of larger than about 3nm (claim 4); wherein said oxidation-resistant conductive layer has a thickness of smaller than about 10nm (claim 5) through routine lab experimentation and optimization to minimize surface of the topography of a MR head; thereby improving the density of the read/write magnetic head (see col. 2 lines 40-44).

Regarding claim 6, Chen et al teach that wherein said cap layer [Cap, fig. 9] comprises Ta (see col. 7 lines 50).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al, US patent (5,491,600) in view of Pinarbasi, US patent (5,883,764).

Regarding claim 7, Chen et al do not teach that the magneto-resistive structure comprises an anti-ferromagnetic pinning layer, a ferromagnetic pinned layer having an exchange coupling with said anti-ferromagnetic pinning layer, a ferromagnetic free layer, and a non-magnetic separation layer interposed between said ferromagnetic pinned layer and said ferromagnetic free layer.

However, Pinarbasi teach that the magneto-resistive structure [fig 4] comprises an anti-ferromagnetic pinning layer [421], a ferromagnetic pinned layer [420] having an exchange coupling with said anti-ferromagnetic pinning layer [421], a ferromagnetic free layer [410], and a non-magnetic separation layer [415] (see col. Col. 5 lines 44-45) interposed between said ferromagnetic pinned layer [420] and said ferromagnetic free layer [410] (see fig 4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the MR layer of Chen et al to include an anti-ferromagnetic pinning layer, a ferromagnetic pinned layer having an exchange coupling with said anti-ferromagnetic pinning layer, a ferromagnetic free layer, and a non-magnetic separation layer interposed between said ferromagnetic pinned layer

and said ferromagnetic free layer as taught by Pinarbasi because the modification would improve the lead conductance of magnetic read/write head (see Pinarbasi col. col. 4 lines 14-15).

The prior art made of record and not relied upon

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Kamo et, US. Patent (4,821,012).

b. Hara et al, US patent (5,946,167).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dzung Nguyen whose telephone number is (703) 305-9695. The examiner can normally be reached on Monday-Friday from 8:30 am to 6:00 pm.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3900 and fax number is (703) 872-9314.

Dzung Nguyen

6/16/02

HOA T. NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600 6/17/02